

Claims:

1.) A thermal reformer system, comprising:

5 a planar assembly including a reformer zone, a combustion zone, an inlet reformat process fluid manifold, an outlet reformat process fluid manifold, an inlet combustion fluid manifold, an outlet combustion fluid manifold, an inlet reformat process fluid flow passage connecting the inlet reformat process fluid manifold and the reformer zone, an outlet reformat process fluid flow passage connecting the reformer zone and the outlet reformat process fluid manifold, an inlet combustion fluid flow passage connecting the inlet combustion fluid manifold and the combustion zone, and an outlet combustion fluid flow passage connecting the combustion zone and the outlet combustion fluid manifold.

2.) The thermal reformer system of claim 1, wherein said reformer zone and combustion zone are be in thermal contact to promote transfer of combustion heat into said reformer zone to drive a reaction in said reformer zone.

15 3.) The thermal reformer system of claim 1, wherein said reaction is a reformation reaction that produces at least hydrogen as a product of said reaction.

4.) The thermal reformer system of claim 1, wherein a primary reactor zone is provided, consisting of said reformer zone and said combustion zone, centrally located within said assembly.

20 5.) The thermal reformer system of claim 1, wherein a plurality of planar assemblies are stacked one atop the other to provide a modular reformer assembly of one or more individual assemblies.

25 6.) The thermal reformer system of claim 1, wherein said inlet reformat process fluid flow passage is in thermal contact with said outlet reformat process flow passage and/or said outlet combustion fluid flow passage to promote transfer of heat from outlet fluid(s) to inlet fluid(s).

7.) The thermal reformer system of claim 1, wherein said inlet reformat process fluid flow passage is located circumferentially within the assembly.

8.) The thermal reformer system of claim 1, wherein inlet combustion fluid flow manifold is divided into an inlet combustion air manifold and an inlet combustion fuel manifold.

9.) The thermal reformer system of claim 1, wherein said inlet combustion fluid flow passage is divided into an inlet combustion air passage and an inlet combustion fuel passage.

10.) The thermal reformer system of claim 1, wherein said inlet reformat process fluid manifold is divided into an inlet water/steam manifold and inlet fuel/water/steam manifold.

11.) The thermal reformer system of claim 1, wherein said inlet reformat process fluid flow passage is divided into an inlet water/steam passage and an inlet fuel/water/steam manifold.

12.) The thermal reformer system of claim 11, wherein said inlet water/steam passage and said inlet fuel water/steam manifold are connected prior to entering said reformer zone.

13.) The thermal reformer system of claim 1, wherein said outlet reformat process fluid flow passage is divided into any one of a pre-shift flow passage, a shift reactor, and a post shift flow passage.

14.) The thermal reformer system of claim 13, wherein said pre-shift flow passage or said post shift flow passage are single or multiple passages connecting said outlet reformat process fluid manifold and a primary reactor zone.

15.) The thermal reformer system of claim 13, wherein said pre-shift flow passage and said post shift flow passage are provided in a counter-current configuration, respectively, such that flow therein flow in opposing directions or wherein said pre-shift flow passage and said post shift flow passage are both provided

in a configuration such that flows therein flow concordantly in same general direction within said planar assembly.

16.) The thermal reformer system of claim 1, wherein one or more of said inlet reformat process fluid manifold, an outlet reformat process fluid manifold, an inlet combustion fluid manifold, an outlet combustion fluid manifold is external to said planar assembly.

17.) The thermal reformer system of claim 1, wherein said the assembly is constructed of sheet metal components.

18.) The thermal reformer system of claim 1, wherein at least one of said an inlet reformat process fluid flow passage, outlet reformat process fluid flow passage, inlet combustion fluid flow passage, reformer zone and combustion zone are created by pressed sheet metal components.